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Editorial.

EGYPT AND THE SUDAN.

THE annual reports of the P.V.O. of the Egyptian Army and of the Director of the Veterinary Department, Sudan Government, for the years 1919 and 1920 have lately come under our notice, and it is interesting to observe the evidences of scientific progress and the valuable nature of the veterinarian's effort in these out-lying parts of the Empire.

The reports in question are both furnished by Lieut.-Col. J. B. Tapley, D.S.O., who ably combines in his person both the above offices.

If fears of encroachment upon our rightful professional sphere, or of belittlement of our scientific value or status, trouble us at home from time to time, no such thoughts disturb as we glance through the pages of the records of service rendered to the State by the Veterinary Department in Egypt and the Sudan.

It is a trite observation that no one is indispensable, but the soundness of the aphorism may well be doubted as applied to the veterinarian where the development and welfare of the semi-civilised country is concerned and its conversion to anything even approaching settled and prosperous conditions.

In such lands the advancement of the country is inseparably bound up with the welfare of its live-stock, and its inhabitants judge the prosperity of the land not according to modern standards of wealth, culture, or form of government, but rather as Moses judged in his pronouncement : " Blessed shalt thou be in the fruit of thy cattle and the increase of thy kine and of thy sheep."

Conditions of life among the nomadic tribes of the Sudan are to-day much as they were in Mosaic times, and it is probable also that their animal diseases have throughout the ages remained equally unchanged

in character and uninfluenced by measures of State control or scientific repression right down to the advent of the British veterinarian within the last decade or so. This appears the more strange inasmuch as the office of the veterinarian was well recognised in Egypt some 3,000 years ago—as several papyri testify—although evidence is nowhere found as to his employment in his more important role, as a man trained to repress as well as cure disease. "*Tempora mutantur*"—and the Pharaoh of to-day, when his live-stock are threatened with "a very grievous murrain," sends for his P.V.O. and the plague is stayed.

That at least is our impression on looking through the pages of the Egyptian and Soudanese Veterinary Reports, which contain—*inter alia*—so formidable a list of epizootic and enzootic diseases as to make one wonder why, with such a wealth of material at hand for a more extended list, the original plagues of Egypt were limited to only ten in number.

Statistics for such maladies as horse-sickness, trypanosomiasis, East Coast fever, or filiariasis show the incidence of the more essentially tropical type of disease, while epizootic lymphangitis, pleuro-pneumonia contagiosa, foot and mouth disease, rinderpest, etc., add a formidable weight to the list of diseases which have to be coped with. Dashes of local colour, so to speak, are provided by such items in the list as "Killed by lions," "Snake bite," "Fell down wells," etc.

In a land where the camel is the chief beast of burden, it is not surprising to find a special casualty list devoted to this animal. Thus in the Egyptian Army for the year 1919 we note about 240 camels died from various causes and 120 were cast and sold, while in 1920 about 500 died or were destroyed and 44 were cast and sold, an increased casualty list over the previous year owing to losses on active service with patrols "working under adverse conditions" in Southern Soudan. Of the total deaths in 1920 as many as 211 were due to trypanosomiasis, while it may be conjectured that a good percentage of the 135 cases dying from causes "not stated" were due to the same malady.

It will thus be seen that this disease exacts a heavy toll from the camel in the Soudan. The exact species of trypanosome is not mentioned, but it is probably the *T. soudanese* of Laveran, spread by flies of the Tabanus or Stomoxys family, such as cause the disease "Tahaga" in dromedaries in the upper Niger, and "Zousfana" in horses in South Algeria. It appears possible, however, that the trypanosome may be the *T. congolense* (Nanum), of which the carrier is the *G. morsitans*, the same fly which is the vector in the "tse-tse" disease of lands further south; but whatever the exact species of blood parasite, the toll exacted from the bactrian is evidently a heavy one.

The camel, indeed, appears the only beast of burden adapted by nature and habit to the country, for the horse and mule are susceptible both to horse-sickness and trypanosomiasis, while the donkey, which is more resistant to horse-sickness, is slow for transport purposes and can carry only about a fourth the load of the camel. That the donkey is not only extensively employed, but bears his full load of the ills incidental to State service, will be seen from the fact that the casualties of the Egyptian Army under this heading were 1,128 in 1920, while the wastages of the horse and mule were 115 and 209 respectively, of which latter figure the disease horse-sickness was responsible for 61 deaths amongst the mules alone.

Most significant, however, of the difficulties of veterinary administration in the Egyptian Army is the return for 1920, showing that the percentage of loss and wastage amounts to 26 per cent. of the total animal strength. To those who have experience of the responsibility of veterinary administration in distant and unsettled lands such figures speak eloquently .

Privations due to long forced marches under a torrid sun, shortage of water and often of food, flies, torrential rains, swamps and engulfing mud, the general absence of made roads, and endless travel on hot and shifting sands, these are normal conditions of service, sufficiently exacting to the patient beast of burden without the prevailing dangers of the deadly fly or pathogenic tick, etc.

To those who know, the wonder is, not that the total percentage loss from disease and wastage is so high, but, rather, that it should be kept at so low a figure as 26 per cent.

The staff of veterinary officers—some eighteen in number—doing duty with the Egyptian Army appear to undertake also the civil duties of the Veterinary Department of the Sudan Government, and to be responsible for the control of animal disease over an approximately equal number of provinces, many of them of enormous extent. Here the control is attempted of such diseases as rinderpest, pleuropneumonia and East Coast fever, an attempt which seems to secure a large measure of success, especially in the control of rinderpest, a disease which appears enzootic.

Veterinary control over nomadic tribes, sceptical as to the motive and utility of the preventive measures urged upon them, and intolerant of anything in the nature of quarantine measures, must constitute in itself a problem calling for the exercise of unusual skill and tact.

We congratulate our professional brethren who are doing such excellent work in Egypt and the Sudan, and we are glad to see that the Egyptian authorities are so alive to the value of the work performed

as recently to confer upon the P.V.O. and Director—Col. Tapley—the decoration of the Order of the Nile.

We offer him our congratulations upon this honour, and also upon the valuable and successful work undertaken by him and his colleagues as reflected in the reports under review.

The frontispiece shows the Gordon Memorial College at Khartoum, containing the excellent veterinary laboratory wherein much of the work of diagnosis and research for the Veterinary Department is conducted.

General Articles.

ORGANOTHERAPY AS KNOWN TO THE ANCIENTS.

THE treatment of disease by means of animal extracts is as old as the history of literature. Its modern application dates from the treatment of thyroid insufficiency by means of extracts of thyroid gland, since when considerable extension of this method of therapy has taken place. The subject, however, is still largely in the experimental stage, and it will be some time before the real facts are ascertained.

The old writers had immense faith in the administration of animal extracts. In 1551 Conrad Gesner (1516-1565), a physician and scholar of "prodigious learning," began the publication of his "History of Animals," and in this work, among many other subjects, he collected from ancient writers whatever bore on the subject of the treatment of disease by the administration of the body tissues of animals. This book fifty years later was translated into English by the Rev. Edmund Topsell, Curate of St. Botolph, Aldersgate, London. Topsell was an enthusiast; he appears to have regarded the translation of Gesner's immense and learned work as a Divine duty. He brought no technical knowledge to bear, he was merely a translator who worked under acute difficulties, for he tells us he was paralysed in the right hand. We are indebted to Topsell for a knowledge of the position of affairs in Europe in the middle of the 16th Century, for, judging by the text, there is nothing to indicate that Gesner, a physician, differed from the views of Pliny, Hippocrates, Æsculapius, Galen, and a host of minor men on whom he depended for his information. In the text the treatment of disease by animal extracts is considered under the titles of "The Medicines Arising out of Horses," "The Medicines of the Several Parts of Oxen and Kine," "The Medicines of Wild Swine," ditto of Sheep, ditto of the Ram, and of the Lamb. I only propose to reproduce what Gesner has to say in connection with horses and cattle.

"The Medicines Arising out of Horses."

"The blood of a horse gnaws into dead flesh with a putrefactive force." [It is not very clear what is here intended to be conveyed, especially in the face of the next sentence.] "It very much makes and helps against impostumes and small bunches which arise in the flesh." [It must be remembered that the diseases prescribed for were those of man and not of the horse, though animals are occasionally referred to. By impostumes and bunches are perhaps intended abscess formations and swellings of various kinds, probably mainly scrofula.] The blood of young horses and asses is very good against jaundice and the overflowing of the gall. If blood be swallowed it will destroy and consume the maw (stomach) worms. In pestilence among horses blood and salt are given to the sick, and both internally and externally "horse leeches" use the blood in the treatment of different diseases. In man and animals it is employed in fractures and dislocations. A horse exhausted by work should have blood drawn from the womb, mixed with oil and wine, heated to luke-warmness, and smeared over the body. [We are not told what alternative to adopt if the animal does not possess a womb.] Stiff joints in horses are to be "anointed" with hot blood. The flesh of grass-fed horses was employed in the treatment of snake-bite, but we are not told how. Boiled horse flesh is recommended as a useful medicine in many diseases which are not specified. The fat of the horse is used by women to increase the growth of the hair, while marrow is good to loosen contracted tendons.

The teeth of an entire horse placed on the head of one liable to nightmare prevents it. Teeth are also found useful in the treatment of chilblains. The milk teeth of a horse stop toothache. Shed milk-teeth fastened upon children during infancy procure easy dentition, especially if the teeth have never touched the ground. Crushed and sprinkled upon a man's genitals "doth much profit and effectually help him."

Occasionally we find the author straying away from the subject of disease, for we are told that a horse-hair fastened to the house of a "man's enemy" prevents flies or gnats from flying past his abode.

The dried tongue of the horse ground to powder cures pain in the spleen of man or woman.

The genitals of the horse cure "sores and pains within," and is good for diarrhœa; also in the dried and powdered condition it is an excellent remedy for the "seconds" (seccundines) of a woman.

In the heart of the horse is a bone like a dog's tooth; this drives away all grief or sorrow "from a man's heart."

Hoof dust disperses abscesses and little bunches (scrofula ?) which arise in the flesh. The dust of the hoof of the ass mixed with oil water and hot urine, expells all wens and kernels in man or woman. The ashes of the hoof give great relief in colic or stone, also by a perfume which may be made from dried hoofs a dead child may be expelled from the uterus. The scrapings of the hoof mixed with urine, and poured into a horse's nostrils, promote the secretion of urine.

The milk of mares expells poisons and acts as a purgative. The testicles of a pig, mixed with mare's milk, is an admirable remedy against falling sickness (epilepsy). The milk of the mare is invaluable for clearing the womb of " any filth or matter." It also renders barren women productive, assuages labour pains, and expedites the delivery of a dead child. If the seeds of henbane be added to milk and fastened to the body with a piece of deer's skin, conception is prevented. The last milk drawn from the mare purges. Mare's milk and honey removes pain from wounds of the eye. Cheese made of mare's milk removes all abdominal pain.

A comb " anointed " with horse's sweat and applied to the hair stops its further growth and prevents it turning grey. Pain and difficulty in hearing are relieved by the application of horse's sweat; also pain in the mouth and throat is removed if the sweat from a horse fed on barley or oats be applied to the part, which has previously been washed over with the juice of young green sea-crabs. The sweat of a horse drives away a cough. [It would have been interesting in the present state of our knowledge of asthma had the reverse been stated.] The sweat of a horse cures consumption, but according to some the horse dies shortly or immediately afterwards. Sweat mixed with urine causes a woman in labour to be relieved of a still-born child. The sweat of the horse, and, according to some, of all animals, " breeds wind in a man or woman's face and brings the quinsy " ; it also causes their sweat to " stink." A sword or knife heated to redness and " anointed " with the sweat of a horse, produces a wound which is mortal from hæmorrhage. A horse wounded with an arrow may be cured by administering a mixture of sweat from another horse, bread and man's urine, and the same applied with horse-fat to the wound. The sweat of the horse mixed with urine, if drunk, will drive out of a man " the belly worm or serpent " (round worms) which may have crept into his belly. [The text here indicates the belief that these parasites were taken in as such from without.]

The dung of a horse or ass fed upon grass, if dried and dipped in urine, is a good remedy against the sting of a scorpion. The same medicine, together with the genitals of a horse in vinegar, is good against the scorpion or shrew-mouse. [At this point there follows a

statement about the poison of the mad dog, of which I can make no sense.] The dung of a horse while fresh and warm, applied to a wound stops bleeding; it also drives away corruption in men's bodies if applied to the diseased part. Mixed with oil of roses and applied to the ears it drives away pain and improves the hearing. The dung of an old horse boiled in water, and given to one "troubled with water in his belly, doth presently make vent for the same." An excellent remedy against colic or stone is a handful of dung from a horse fed on oats or barley, but not on grass, mixed with half a pint of wine and reduced to half its bulk by boiling. Horse's dung incinerated and mixed with urine will cure ague and quartan fever. In retention of urine in man pour into the nostrils a mixture of horse's dung mixed with urine.

Cattle which void blood through the nostrils or urinary passage may be treated by making a paste of wheat flour, butter and urine from a horse recently watered; give the paste baked "even to ashes." Horse's urine mixed with water from a smith's trough is a remedy against epilepsy.

The chestnuts on the limbs of the horse were employed in treating epilepsy, after being powdered and mixed with vinegar. It is described as an "excellent preventive." Mixed with oil and poured into the ears it tightens up loose teeth; mixed with claret and taken for forty days it drives away stone or colic.

The following is a summary of the section dealing with the medicines and several parts of oxen and kine. Horn powdered and administered cures cough and consumption; mixed with vinegar it helps the morphew (morphea, a skin disease); infused into the nostrils it stops bleeding; mixed with warm water and vinegar "it wonderfully worketh upon the splenitick passion."

The powdered hoof placed on the King's Evil (scrofula) helps it; the same burned and mixed with milk increases the flow of milk in a woman. The dust of the heel of the ox (ergot of fetlock) mixed with urine tightens loose teeth and removes toothache. The powdered ribs of an ox controls an excessive menstrual flow. The ankle of a white cow steeped in urine for forty days, when applied to the face takes away spots and clears the skin. Ox leather burned and applied to purple faces cures them. Marrow and suet help strains of sinews. Suet helps against leprosy, blotchiness and scurvy; with goose grease poured into the ears it helps deafness. The blood of the ox cures scabies in the dog.

Regarding the therapeutic value of milk, it is said that "volumes might be written" on the subject. It was given in the treatment of

consumption, cough, " hardness of the belly," and in all manner of poisons ; in sore throat it was used as a gargle ; for pain in the stomach " caused by sadness or melancholy " we are instructed to drink cow's milk in which a stone has been placed.

It is stated that in the head of the ox is a little stone which, when in fear of death, " he casts out of his mouth." If this stone be taken it eases dentrition in children. In the second stomach of the cow is " a round black tophus " of no weight (hair ball ?) which is " very profitable " to women in difficult labour. Dried liver cures the flux of blood (dysentery ?). The gall of the cow is more active than that of any animal ; mixed with honey it draws out thorns, the point of a needle, or other " iron thing " in the flesh. It prevents the growth and spread of the King's Evil. Hands washed in gall are made white, " no matter how black they be." If " purblind " eyes [short sight] be anointed with the gall of a black cow, writing may be more plainly read. " There is in ox gall a certain little stone like a ring, which philosophers call Alcheron ; this stone, powdered and held to the nose, clears the eyes." A small quantity mixed with beech juice is good against epilepsy. In deafness take the gall of the ox and the urine of a goat (no dose given). The spleen of the ox taken in honey eases pain of the spleen in man. " The skin that a calf casts out of its dam's belly takes away ulcers of the face." [No information is given as to how the remedy is to be employed.] The urine of the cow " taken in gargarizing " cures " intolerable " ulcers of the mouth.

The end of the section is devoted to the therapeutic uses of the dung of cattle, especially in the treatment of gout and dropsy.

The " medicines " furnished by other animals of the farm are either of little interest or a variation of those already reproduced.

F. Smith.

THE TREATMENT OF FLY-STRUCK CATTLE.

By H. E. HORNBY, M.R.C.V.S.
(*Northern Rhodesia*).

In an article under the above title, published in the *Rhodesian Agricultural Journal* of October, 1920, I drew attention to the favourable results which can be obtained when infected cattle are treated systematically with intravenous injections of tartar emetic.

The trypanocidal action of tartar emetic was discovered in 1907, and since that year many thousands of human beings and animals infected with trypanosomes have been treated by its aid ; in some cases successfully, more frequently unsuccessfully.

I have spent the last seven years in countries devastated by trypanosome diseases, and during that time I have experimented with all the common drugs for which trypanocidal action has been claimed. The conclusions arrived at by me in 1919 appeared that year in the March number of this journal. Briefly, they were to the effect that no good results can be expected when T. brucei disease is treated with tartar emetic, but that the other two common African trypanosomes—T. congolense and T. vivax—are susceptible to its action. As cattle are immune to the polymorphic parasite, this means that all cases of trypanosomiasis of cattle met with, in at any rate South-Central Africa, are due to parasites susceptible to the action of antimony, and that these cases, therefore, can be treated with some hope of success.

In the younger Colonies the relation between a veterinary surgeon and stock-owners is different to the one that exists in England. There are no private practitioners, and so the Government veterinary surgeon is justified in imparting technical knowledge to laymen if by that means he can assist the object of his existence ; the manitenance in health of the stock of the country. In England no practitioner would be justified in instructing farmers how to give intravenous injections of irritant drugs, but then, in England, a practitioner is not the only veterinarian in an area as large as Great Britain. At one period of 1920 I was the only veterinary surgeon in the whole of North-Eastern Rhodesia, Nyasaland, and Portuguese East Africa, north of the Zambesi, and I had work to do in all three countries. Consequently, when I gave the following advice to farmers whose herds were in danger of infection by trypanosomes I was not acting unprofessionally, but, as I think, in the best interests of my profession. My advice to such a one was :—" Provide yourself with a syringe, tartar emetic powders and knowledge of how to use them. Keep a strict watch over your herd, and on the first suspicion of the disease making its appearance inject the affected animal. Do not wait to be sure that it is infected ; if you give the injections carefully you will do no harm even if your diagnosis is at fault ; the only ill-result which follows a course of correctly-given injections is a temporary fatty degeneration of the viscera ; a cow is not even put off her milk. It is true that occasionally a beast collapses and dies immediately after receiving an injection, but such cases do not amount to 1 per cent. of those treated. After giving an injection make a mark on the horn with a file, and when six injections, as shown by six file-marks, have been given, discontinue treatment for three weeks. If successful the animal will commence to pick up from the date of the last injection and will soon present an appearance similar to that of others in the herd. Even so it is

advisable to give an injection once a month for the next six months. Should it not pick up rapidly, then destroy it if it is the only one; if there are more than one they can form a sick herd, to be kept apart from the healthy animals, reinjected, and disposed of to the butcher when fat. Good feeding is an essential part of the treatment. While undergoing the course of injections a beast is not dangerous to others, nor is it so long as it is undoubtedly picking up or looking well. Be always on the look-out for relapses, though; they can be recognised by a recurrence of the original symptoms. Until we know whether by treatment with tartar emetic we are able to bring about a permanent cure, it is advisable to make use of any opportunity which may arise for the profitable disposal to the butcher of any cured animal. At the present time it is dishonest to sell for any purpose other than immediate slaughter a beast treated and recovered, unless you inform the buyer of the risk he takes of introducing a serious disease into his herd.

"Transport riders should remember that the conditions under which they work are conducive to the mechanical spread of the disease among their oxen; they cannot, therefore, be too vigilant in their watch for symptoms nor too hasty in commencing the treatment of suspicious cases. An injected beast can work the same day."

The dose recommended was 25 cc. of a 4 per cent. watery solution. I had a syringe and needle manufactured to my design, so that the operator could dispense with the services of any assistant other than his native servants. The course of injections was six, with five days between each injection. I taught a few selected stock-officers, farmers and conductors how to give the injections, and they, in turn, taught others. Consequently, to-day, this method of treatment is in wide use throughout, at any rate, north-eastern Rhodesia.

The object of this article is to place on record the result of the treatment of his herd by a stock-owner who was a careful observer and a good operator. It has the value of an experiment, because it was conducted so that the animals could be kept under observation for several months following the termination of treatment, during which time they were not exposed to sources of reinfection. Consequently, any animals showing symptoms of the disease at the termination of the experiment must have relapsed.

Msipazi Farm, in Northern Rhodesia, is ten miles from the nearest fly-belt and had been free from trypanosomiasis during the six years the previous owner was on it. On December 1, 1919, the present occupier, Mr. L. J. Holmes, had a herd of 31 healthy, adult cattle. A beast became infected somehow or other and died on January 5,

1920. By January 17, five more were ill and their blood rich in trypanosomes (T. congolense). By February 10, three more had died and eleven more were sick. On February 26, 1920, only four of the original 31 remained apparently sound. I commenced to treat all the affected animals and administered the first three of the course of six injections. After that Mr. Holmes continued the treatment. The course of the disease had been unusually rapid, so we were obviously dealing with a particularly virulent strain of T. congolense. One animal died under treatment and one was lost in the bush.

At the middle of April, 1920, the herd consisted of 20 treated animals and five untreated ones. The former looked better than they did, but had not progressed as satisfactorily as is often the case. Meanwhile two of the five untreated ones had developed symptoms of the disease, and, as all the cattle had been running in one herd at a time when biting-flies were numerous, we wondered if any of the treated animals had been reinfected by these fresh cases. There is always this danger when one treats a few individuals in a herd ; one does not know whether a treated beast which subsequently succumbs to the disease has relapsed or been reinfected. Accordingly Mr. Holmes and I took counsel together and decided to treat every animal in the herd, and not to introduce any strange beast into their company for several subsequent months, but to keep the herd entirely isolated from other cattle. We thus hoped to be able to determine what likelihood of recovery and of subsequent relapse follows treatment along the proposed lines.

We gave a course of injections to the whole herd, including the 20 which had already been treated in March. It is probable that three or four of the total number were not and never had been flystruck, but it is certain that at least eighteen were definite cases.

The twenty-five animals, consisting of seven cows and eighteen oxen, received their last injection on May 12, 1920.

On November 16—that is, just six months' later—all the animals were in from fair to good condition and nine oxen were sold on that date to the butcher as fit for white consumption.

On January 20, 1921, one cow died suddenly, but as she was fat and in-calf it is unlikely that she died from "fly." The remaining six cows were in satisfactory condition on that date, and four had either calves at foot or were in calf, the two others being very old animals.

Since the sale in November the remaining nine were kept hard at work, with the result that by January 25, 1921, they were losing

condition again and two appeared to have undoubtedly relapsed. At any rate, Mr. Holmes, having faith in tartar emetic, decided on that date to be on the safe side and commenced retreatment of all the nine.

Thus the experiment ended and its result is in agreement with my general experience of treatment, which is this :—

A course of six injections of tartar emetic—1 gm. being the dose for an average-sized native cow or ox, which weighs 700 lbs.—given at intervals of five days, rarely fails to ameliorate the course of trypanosomiasis in bovines. A second or third course, commenced a month after the completion of the previous one, may be necessary before a cure is effected. Such a cure is likely to be temporary. When a beast relapses it is just as amenable to treatment as it was in the first instance. When a herd is well removed from all fly-belts it is sound policy to sell to the butcher all treated and recovered animals. On farms close to " fly " where it is impossible to maintain a " fly-free " herd, it is possible to keep a small herd of working and dairy cattle by the regular injection of the cases as they appear ; the farmer runs his cattle in two mobs, those under treatment and those not requiring treatment, and every fifth day or so those in the former lot are thrown and injected, being transferred to the healthy mob when the file-marks on their horns show that they have had their complement of injections.

Since writing the above I have received a letter from the manager of a large ranch who has suffered severely from " fly," and who has had occasion to treat several hundreds of fly-struck cattle. He says :— " I do not agree with your theory that cure is only temporary. The transport oxen which you and I treated in 1919 are in splendid condition, and it is a treat to see the sleek spans pulling their 8,000-10,000 lb. loads. I do not, however, think that six consecutive injections are enough ; I prefer to give a dozen."

Another letter just received from a stock-officer on Tanganyika Plateau informs me that a whole span recovered after a course of six injections.

Undoubtedly, then, tartar emetic is of great value in the treatment of flystruck cattle.

Clinical.

TWO CASES OF NEPHRITIS IN THE HORSE.

By J. F. CRAIG, M.A., M.R.C.V.S.,
Principal of the Royal Veterinary College of Ireland.

THE following two cases are of interest because, although they have many clinical features in common, there are considerable differences in the kidney lesions presented by them.

CASE I.—CHRONIC INTERSTITIAL OR GLOMERULO-NEPHRITIS.

The subject was a three-year-old brown thoroughbred filly.

History.—As a two-year-old she had been put in training, but had overshot her fetlocks in front. Further training was therefore abandoned, and she was sent out to grass with the intention of breeding from her later on. About this time, when at grass, the animal was said to have received a wound on the hind fetlock, and a slight swelling resulted, from which the filly soon recovered.

Three weeks before the animal was admitted to the College a hard, tense swelling appeared on the right flank, and soon afterwards a similar one developed on the left flank. These were thought to be due to the stings of wasps, and were treated with liniments containing ammonia. The swellings rapidly disappeared, but soon afterwards the hind limbs became swollen from the coronets to above the hocks. The swellings were fairly tense, but not painful. Later the skin around the nostril became swollen in a similar way. During this time the filly fed well, but showed distinct debility.

Symptoms.—On examination the animal appeared dull and weak, standing with the eyes half closed and the head depressed. She walked very stiffly, the fetlocks of both fore limbs being overshot. The condition was fairly good. Both hind limbs were swollen from the pasterns to near the stifle. The swelling was painful, pitted slightly on pressure, and the skin in front of the hocks and metatarsus was scurfy and cracked. The tenderness and scurfy condition of the skin was probably due to the action of some liniment. There was also a firm, slight œdematous swelling under the chest between the forelimbs, which pitted on pressure. The muzzle was also slightly swollen. There was a marked jugular pulse, the jugular vein standing out prominently. The pulse was 72 per minute and rather weak. The conjunctiva was œdematous and deeply congested, as was also the nasal mucous membrane, but to a lesser extent. Respirations were 24 per minute, and the temperature 99.8° F. The cardiac impulse was marked on the left side. On auscultation of the heart the first sound appeared dull and deduplicated.

Blood films prepared from the animal showed nothing abnormal. A sample of urine was examined. It was ropy and clear, of a slight

yellowish colour, slightly alkaline, specific gravity 1,030, and contained albumen and mucin. The percentage of albumen in the urine estimated by Esbach's method was .03 per cent. There were few cells present, and no renal casts. There was no sensitiveness shown on manipulation over the loins or on examination of the kidneys by rectal exploration.

The diagnosis of nephritis was made and the owner notified, a very unfavourable prognosis being given.

The animal became steadily worse, fed badly, and lost condition rapidly. The swellings became more extensive and involved the fore limbs, and the eyelids became puffy. In subsequent examinations the respirations numbered 12 per minute, the pulse varied between 60 and 80, and the temperature between 98.6° F. and 99.8° F. Repeated examinations of the urine gave similar results to those already noted. In about a week the animal was so weak that she was unable to rise, and ceased to feed, and on the following morning was found dead.

Post-mortem Examination.—A post-mortem examination was carried out the same day. There was very little fat in the body. The connective tissue, especially of the limbs, was dropsical. The peritoneal cavity contained some clear yellow fluid, estimated at about two quarts. The liver was soft, yellowish and fatty, and the margins were very dark. The spleen was normal. A small aneurism was found at the origin of the direct and indirect colic arteries and two smaller ones in the course of the former artery. In the aneurisms a few specimens of the *Strongylus vulgaris* were identified. In the ileum of the small intestines a small abscess about the size of a hazelnut was found under the peritoneum and five smaller ones under the mucous membrane near the pelvic flexure of the double colon, each with a small dark point at its summit. The purulent contents of these were thick and yellow. There were no worms present in them, but colon bacilli were identified in the pus. The lungs showed no macroscopic change. The pericardium contained about one quart of dropsical fluid. The heart weighed 11 lbs. 3 ozs., the right ventricle was dilated, and one of the cusps of the tricuspid valve was closely adherent to the septum.

The Kidneys.—The right kidney was enormously enlarged and weighed 5 lbs. 4½ ozs., and a division into lobes was imperfectly marked on its surface. The left kidney weighed 1 lb. 1 oz. The venæ stellulæ were deeply congested. In both kidneys the capsule was closely adherent and difficult to strip off. The consistence of the kidneys was firm, and on section the cortex was streaky grey and the medulla and boundary zone distinctly congested. The pelvis of the kidney was filled with mucus. The mucous membrane of the urinary bladder

was deep red in patches, and was dotted over with numerous patechiæ. Sections were prepared from both kidneys.

Microscopic Examination.—On microscopic examination of these sections the capsule was found to be thickened and its fibrous tissue continuous with that of the cortex. In sections of the left kidney the glomeruli of the cortex appeared to be extremely numerous, probably as the result of contraction of the inflammatory fibrous tissue. These glomeruli presented profound changes. They were being converted into solid, shrunken, almost bloodless cellular masses filling only a small portion of Bowman's capsules, the lumina of which were in a few instances filled with albuminous material. These capsules were surrounded by one or several concentric layers of white fibrous tissue. Near the surface of the kidney some of the capsules were represented by large rounded spaces, the glomeruli having disappeared, and these spaces were filled with some homogeneous albuminous material which, on staining, was slightly tinted with eosin. At some points in the cortex the glomeruli had become fixed throughout to the outer walls

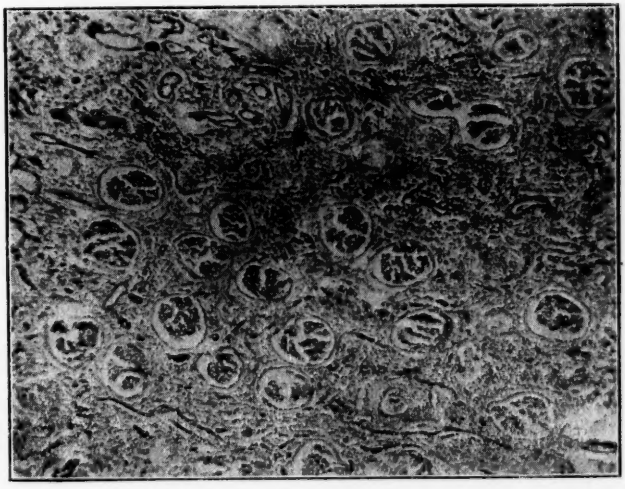


Fig. 1.—Cortex Left Kidney, showing the changes in the Glomerulia and the large amount of New Fibrous Tissues.

of Bowman's capsule, and solid, partly cellular, masses were left which were continuous with the surrounding connective tissue. The uriniferous tubules in the cortex had, in greater part, disappeared and their place taken by new connective tissue. Only here and there could one identify isolated sections of convoluted tubules. Those of the straight tubules which were left were represented for the most part by

thin solid strands, composed of two layers of a low columnar or flattened epithelium. Many of these epithelial cells were impregnated with brown pigment granules. The new connective tissue of which the cortex was largely composed was loosely and irregularly arranged, and here and there in it could be observed accumulations of fibroblast and round cells. In the boundary zone and medulla the blood vessels were distended with blood, and at places hæmorrhage had taken place into the spaces of the connective tissue and the uriniferous tubules. Some of the tubules in the boundary zone were very much dilated, and even converted into small cysts with albuminous contents. This dilatation was noticeable, but not to the same extent, in the medulla, and some of the tubules contained albumen and a few *leucocytes*. The tubules in the boundary zone and medulla had not disappeared to anything like the extent noted in the cortex. In sections of the right kidney the glomeruli were not nearly so numerous as in the sections of the left kidney, only one or two being seen in a field with a magnification of about 50. The same changes, however, were noted in these bodies, and Bowman's capsule, but the latter appeared to be enlarged. In the right kidney there was not nearly so much fibrous tissue, and that which was present was largely distributed around the Bowman's capsules. The most striking feature of the sections of the cortex was the enormous calibre of the uriniferous tubules, particularly the convoluted tubules. A few of them contained one or two calcium

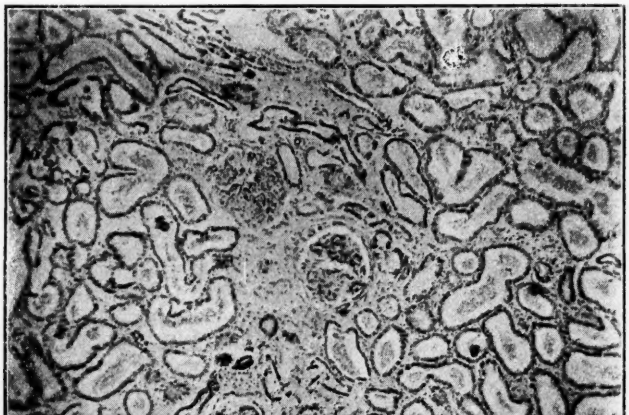


Fig. 2.—Cortex Right Kidney, showing the changes in two Glomeruli and the enlargement of the Uriniferous Tubules.

carbonate crystals, and some were filled with albuminous material. In the boundary zone and medulla the changes were similar to those noted in the left kidney, save that no cysts were noted in the boundary zone. Neither in films nor sections nor by attempted cultivation were organisms identified in the lesions. One might, therefore, suppose that the nephritis was toxic in origin, and it is quite possible that the toxins which caused the nephritic changes were manufactured in the abscesses in the bowel wall, and that the abscesses were set up as a sequel to invasion by *Strongyles*. From comparison of the lesions in both kidneys it appears probable that, since the changes were more profound in the left kidney, this organ was first affected, and the enlargement of the right kidney with hypertrophy of the tubules was an inadequate attempt at compensation. If the above explanation is correct regarding the development of the disease it would appear justifiable to conclude that the glomeruli and Bowman's capsules were primarily affected, and the condition would then be correctly termed a glomerulo-nephritis.

CASE II.—CHRONIC PURULENT NEPHRITIS.

This case was observed in a three-year-old bay half-bred gelding.

History.—The animal had been out at pasture for some time on the Dublin mountains, and nothing had been noted amiss until a few days prior to the date of admission to hospital. Then the chief symptom observed was a large subcutaneous swelling under the abdomen.

Symptoms.—On first examination the gelding was very fat, and the swelling under the abdomen was pronounced, particularly at the sides, extending forwards from the lateral aspect of the prepuce as far as the point of the elbow. The sheath was also swollen. The swelling was œdematous, pitted on pressure, was not painful, and not sharply circumscribed. The hind limbs above the hocks were also slightly œdematous. The visible mucous membranes were pallid, the pulse 78 per minute, small and thready, the respirations 18 per minute, and the temperature 101.6° F. On auscultation over the chest the lung and heart sounds were observed on each side in the lower portion. The fæces were examined for *Strongyles*, and eggs of these parasites found in moderate numbers. The fæces were distinctly yellow, and covered with mucus.

A definite diagnosis was not made at this time, but heart and general tonic medicine was prescribed.

In the course of a few days the animal was observed to become very weak. It staggered in its gait, lay down a great deal, and frequently ground its teeth. Its appetite was poor, it would take green food and hay, but refused mashes, and it ate oats very sparingly.

The œdematous swellings under the abdomen decreased, but those on the hind limbs became more extensive and larger. The pulse varied from 60 to 84, the respirations from 18 to 40, and the temperature from 99.8° to 101.8° F. On rectal examination no abnormality and no marked sensitiveness could be found in the kidney or spleen or other abdominal organs which came within reach. A sample of urine was drawn off and examined. It was distinctly yellow but clear, specific gravity 1,024, slightly acid in reaction. It gave no reaction to Fehling's test, but a hazy white ring with Heller's test. The percentage of albumen in urine estimated in the albumenometer with Esbach's reagent was .05 per cent. No casts or cells were observed in films of the deposit thrown down after centrifugalisation, and only an occasional organism was found which was thought to be accidental. A diagnosis was, therefore, made of nephritis, accompanied by dropsy of the tissues and cavities. Tonics, including Ferri Carb. and Digitalis were continued, and salicylic compounds varied with iodine preparations were administered daily, an occasional laxative being given.

Further Course.—The animal continued to lose condition rapidly, and remained very dull, often standing with the head depressed and with a haggard expression. It often lay down flat on its side, and then made a slight grunt with each expiration. The swelling under the abdomen became less marked, but those on the hind limbs became much more prominent, and a large swelling developed under the sternum between the fore limbs. A large serous cyst formed on each of the buttocks from leaning against the manger. In subsequent examination of the urine, this excretion was often alkaline, sometimes opaque, from the presence of oxalates and carbonates of lime, and the albumen varied in amount from $\frac{1}{4}$ to $\frac{1}{2}$ gram per litre of urine. At no time were renal casts, nor was any appreciable number of cells found in the urine.

In blood films there was some evidence of anæmia, *poikylocytosis* and *anisocytosis* being chiefly noted.

As the urine passed became excessive in quantity digitalis was withdrawn from administration. After a time the animal had to be assisted to rise and had to be kept in slings. A very strong urinous odour was later given off from the skin, and the flanks and sides were often wet with urine.

The condition of the animal became very poor, although there were often variations in its general state.

In forty-four days after its admission to hospital the gelding died.

Post-mortem Examination.—A post-mortem examination was made the following day. There was very little fat in the body, its place being taken by a yellow gelatinous material. The subcutaneous

connective tissue of the abdomen and chest were thickened, and œdematous. A large abscess about the size of an apple was found under the skin below the sternum. There was some dropsical fluid in all the serous cavities. The liver was yellowish and friable. The spleen showed no obvious abnormality. The lungs presented some slight hypostatic congestion. The heart muscle had a macerated appearance and the right ventricle was dilated. A large plasma clot was found filling up the ventricle and auricle of each side. Two sternal ribs (seventh and eighth) of the off side were fractured near the lower extremity, and at the fracture there was a slight callus formation.

A verminous aneurism about the size of a walnut was noted at the root of the anterior mesenteric artery, in which a few specimens of *Strongylus vulgaris* were located. The mucous membrane of the cæcum and also of the first and, to some extent, the third portion of the double colon was invaded by numerous small larval *strongyles*. Several species of adult *strongyles* were free in the lumen, including *Strongylus edentatus* and *vulgaris*. A few bots were attached to the cuticular portion of the stomach.

The important lesions were found in the kidneys. The kidneys were enormously increased in size and weight. The left kidney

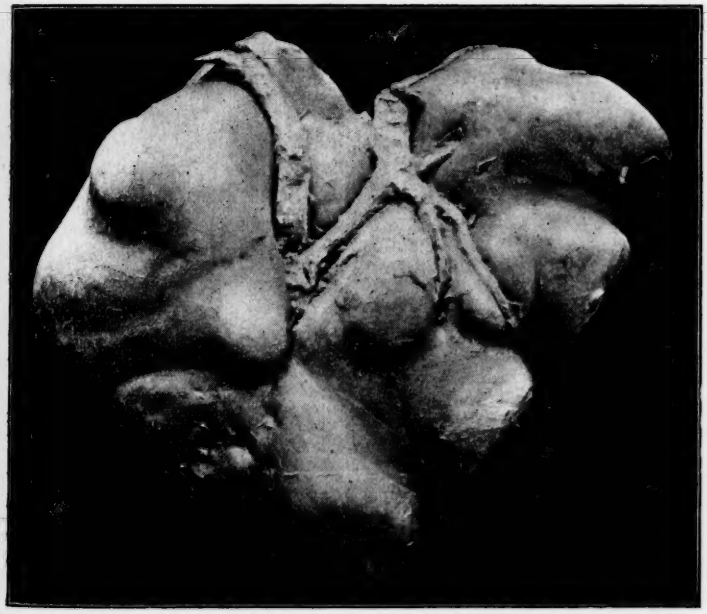


Fig. 3.—Left Kidney. Ventral Surface.

weighed 4 lbs. 10 ozs. and the right kidney 4 lbs. 4 ozs. In both cases large round knobs, like the broad ends of pullets' eggs in size and shape, projected on the surface. They were yellowish white in colour, and were moderately soft in consistence. In the left kidney there were twenty-one and in the right eighteen of these projections. The capsule of the kidneys was thickened and closely attached to the surface of the swellings, but elsewhere was easily removed.

On horizontal section of each kidney it was found that the projections were conical in shape and the narrow end extended into the substance of the kidney as far as the medulla. The cortex was chiefly involved and the bodies were yellowish white and soft throughout.

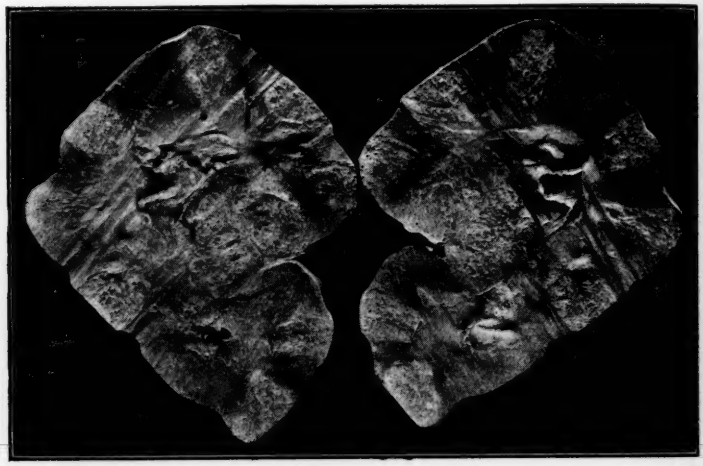


Fig. 4.—Left Kidney. Horizontal Section.

Between these bodies there was no obvious change observed in the kidney substance.

Films from the soft material in the swelling contained numerous *polymorphonuclear leucocytes*, a few round cells and Gram positive *staphylococci*.

Cultures of *staphylococci* were isolated from the lesions and grown on agar, serum and potato. The growths were identical with those of the *staphylococcus pyogenes aureus*. A rabbit was inoculated subcutaneously from the lesions, but beyond the formation of a small local abscess no other symptom developed. The abscess increased in size to that of a pea, did not rupture, and in two months' time its contents were quite sterile.

Sections were prepared from the lesions in the kidney, and also

from what appeared to be normal kidney substance. In the latter case no distinct change in the histology of the kidney was discovered. In the lesions the uriniferous tubules had largely disappeared and were replaced by numerous abscesses of varying size and shape. The abscesses were formed of masses of *polymorphonuclear leucocytes*, and in their centre were numerous Gram positive *staphylococci* in large numbers, sometimes massed together. Many of the surrounding *leucocytes* were undergoing necrosis. There were hints at places of the formation of the pus centres in the Malpighian bodies, and in some cases the pus appeared to have accumulated in the course of the uriniferous tubules. The abscesses were separated from one another

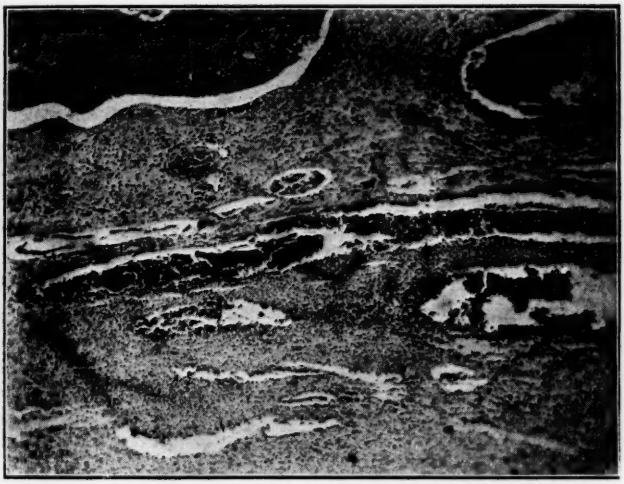


Fig. 5.—Cortex Kidney. Showing the Small Abscesses separated by Strands of New Fibrous Tissue.

by varying amounts of young fibrous tissue in which plasma cells were often found in clumps or lines.

In the granulation tissue long bundles of fibres were scarce, the white fibres formed a loose network, and this tissue was permeated with *leucocytes*. The lesions were separated from the normal kidney tissue by inflammatory fibrous tissue, and here the blood vessels were congested.

In examination of the renal artery no evidence of large emboli could be found to account for the localised nature of the lesions. The source of infection of the kidneys is difficult to ascertain. Two sources might be suspected, namely, the subcutaneous abscess under the sternum and the worm infection of the bowel. Of these two, the latter source is the most probable.

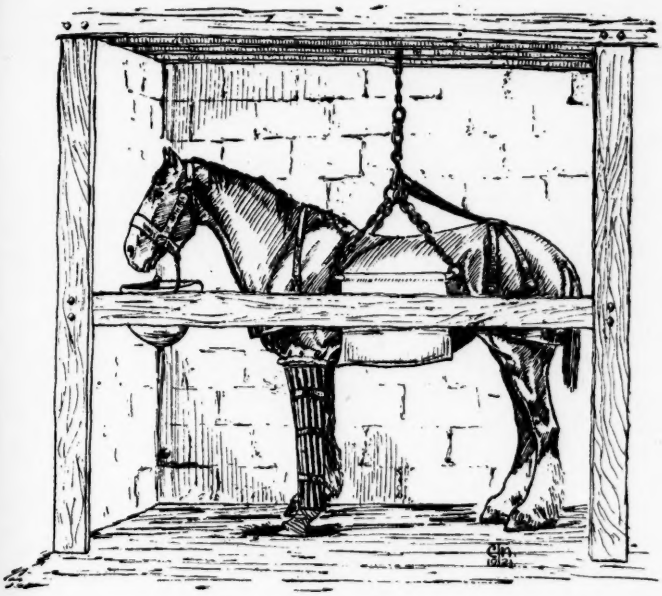
The subcutaneous abscess at the sternum did not develop till the later stages of the affection, whereas albumen was discovered in the urine at an early stage in the course of the disease.

FRACTURE OF THE RADIUS IN A CLYDESDALE MARE.

By DAVID IMRIE, M.R.C.V.S.
(*Professor of Surgery, The Veterinary College, Glasgow*).

THE patient, a thirteen years old Clydesdale brood mare, had the left radius fractured, the result of a kick in July of last year.

The fracture was a simple transverse one close to the knee, a most difficult one to treat successfully. The owner was anxious to save his animal and readily consented to treatment being adopted. The mare was put in a narrow stall erected for the purpose in the corner of a roomy loose-box which had earth for the floor, and placed in slings. When seen next day she was apparently suffering greatly, the pain of the fracture being much aggravated by the almost continuous movement of the leg. It was decided to postpone putting the limb in splints or plaster as it was considered that owing to the condition of the limb a satisfactory operation could not be carried out without first placing the animal under a general anaesthetic—a proceeding to which there were decided objections ; and in the meantime to make an attempt to induce or cause extension of the limb. In order to carry out the latter idea a plan was formulated whereby it was thought that weight might be exerted on the affected leg. The first step in the execution of this plan was the removal to a depth of about five inches of that part of the ground on which the foot of the injured leg might at any time rest. A certain measure of relief seemed to be obtained right away from the altered position of the limb which now merely touched the ground. Next day the severity of the pain had abated considerably. Further operations in the development of the plan were suspended and ultimately abandoned as being unnecessary, for every day saw a further slight improvement in the general condition of the animal. After a few days it would have been an easy matter to have put the limb in splints or plaster, the limb being now extended, the muscles relaxed and the approximation of the ends of the divided bone an easy possibility. But for reasons which need not be stated, but which had nothing to do with the treatment, nothing further was done for another week. The leg was then encased in a thick coating of plaster of Paris which reached from the elbow to the coronet. During the operation the mare behaved admirably—the actual operation presenting no difficulties. As soon as it was completed, however, she moved the limb rather vigorously in an attempt to get rid of the plaster with the result that the casing behind the knee was broken. An improvised splint in the shape of a broad piece



of tin placed round the limb at the knee and effectively kept in position by stack rope wound round it prevented further damage and made good the deficiency. On the following day the tin splint was replaced by one fashioned from the travelling canvas of a self binder. This was cut to the desired length and width, had the wooden ribs or spars reinforced by the addition to their number of others placed between those already existing. Three straps fitted with buckles were nailed to the spars—one near the elbow, one at the knee and the other at the fetlock. The new splint was easily adjusted to the limb and, once on, was not taken off for ten weeks, when it was removed for good, as was also the plaster. The mare was kept in the slings for another two weeks, when she was allowed her freedom in the large loose-box.

She is now, and has been for a long time, going practically sound and fit for work, but has been spared as she was known to be in foal. She has since foaled and the very slight deformity is of no account and was probably caused when the mare tried to get rid of the plaster casing.

The new splint completely embraced the plaster casing and therefore did not stop at the fetlock as depicted in the sketch. Mr. Carl Murphy to whom the writer is indebted for both drawings, had not seen this case, hence the mistake.

IRRITATING MEDICINAL AGENTS IN THE AIR PASSAGES OF THE HORSE—TREATMENT BY SALINE SOLUTION AND FORMALIN.

By W. W. LANG, M.R.C.V.S.
(*Brigg, Lincs.*)

Case 1.—Clydesdale gelding. Hurriedly called out as this animal was said to be seriously ill. He had a swelling inside the thigh, and the owner had given a physic ball and a drench which had "cured a case when all the vets. had failed." The animal was found coughing badly, salivating profusely, with accelerated respirations and a temperature of 105° F. Examination of the mouth revealed the mucous membrane of the tongue hanging in tatters—highly reminiscent of the chloral hydrate ball of war time notoriety; while auscultation of the pectoral region revealed strong churning sounds in the trachea. The drench smelt strongly of liq. ammon. fort.

On the fifth day the temperature had become normal, and recovery thereafter was uninterrupted.

The patient received daily sodium chloride lb. ss., formaldehyde 40 per cent. i, aqua gall. iv., per stomach tube.

Case 2.—Shire horse had been drenched with a colic draught. Commenced coughing, discharging froth from the nostrils and salivating to such an extent that an urgent S.O.S. was sent over the telephone.

Found the patient settled down somewhat, but very disinclined to move, and grunting on the least exertion; his chest appeared to be very painful; breathing accelerated; pulse 80; temperature 104° F.

Administered treatment as above. Following morning patient bright and active; slight cough, but otherwise quite well. Attended for three days watching for pneumonia and gangrene, but these did not eventuate.

Case 3.—Thoroughbred in training. Choked after a gallop and was given a pint of water by the groom; coughed badly; owner then appeared and attempted to administer linseed oil, with the result that the coughing was more distressing than ever, and some of the oil was returned through the nostrils.

Found the animal to all intents and purposes in a dying condition, pulseless, membranes blanched and cyanosed, quick catchy respirations, haggard expression. Shook the mercury in the thermometer down to normal, but he did not move it; regretted afterwards that the mercury had not been shaken well below normal, as it is now believed that the temperature was subnormal. Prognosis, very grave.

Gave the now usual treatment, supplementing it by Liq. Strych. ℥i subcutaneously to give the heart a stimulus. In one hour and a

half the pulse, 80, could be felt, and the temperature was 102° F., but otherwise the case still appeared to be serious. In another 3½ hours there was a decided improvement; pulse 56, temp. 103° F., and inclined to eat.

Following morning, 12 hours later, the patient was quite well again. He appears to have sustained no ill-effects whatever, and has since won a race.

Case 4.—Choked with linseed oil administered during an attack of colic. Symptoms as usual, a temperature and accelerated breathing for two days, then recovery. Treatment as above.

Case 5.—Similar to No. 4, but quite well again in 12 hours.

Case 6.—Also choked by linseed oil, and apparently all right in two days, but four days later was found with a temperature of 108.4° F., pulse 96, and accelerated respirations. On the following morning, about 12 hours later, the temperature was 105° F.; 24 hours after that; temperature 101° F.; on the following day temperature normal. During this later illness treatment was administered only three times ; nothing was given on the last visit.

It is admitted that such happy results were, to say the least, unexpected, though welcome. Treatment was based on the anodyne and preservative action of saline—it is excreted through mucous membranes—while in Case 3 it appeared to counteract shock in a very satisfactory manner. Formalin was administered with a view to preventing pulmonary gangrene—an action claimed on its behalf by Professor Imrie.

TRANSVERSE FRACTURE OF OS PEDIS.

By Captain W. WALLACE KERR, M.R.C.V.S.
(*Saffron Walden*).

Subject.—A six-year old half Suffolk and Shire gelding. Weight about 16 cwt.

History.—The horse came home off work (ploughing) absolutely walking sound, was fed and turned into large yard, which was covered with straw. Next morning the horse was lame on off hind and in great pain, and could not put any weight on foot.

Symptoms.—Appeared to point to a punctured sole and with pus, or to some foreign body having penetrated and lodged in the foot. There was no heat present in the foot either in sole or wall, and there was no swelling of the coronet or affected leg. Yet the horse was in agonising pain.

Examination.—The shoe was removed, the sole and wall were percussed by hammer, and pressure exerted with pincers, and pain was evinced in region of the sole near the inside bar. A small exploration puncture was made, but only blood exuded.

Treatment.—Hot bran poultices were applied morning and night for three days, physic ball administered, but no improvement. Blisters were applied to the coronet and the foot bandaged in tow, with oily compresses on sole for about two weeks. Still no improvement. The sole was again explored and a separation was found beginning between horny and sensitive soles. This was removed carefully, but still no evidence of pus.

Diagnosis.—At the onset the lameness might be due to several causes, such as : (1) Punctured sole ; (2) pus in the foot ; (3) injury in nailing of shoe ; (4) acute laminitis ; (5) rupture of flexors at their insertion ; (6) fracture of navicular bone, os corona or os pedis. Fracture of the os pedis was arrived at from the onset, but the cause of the fracture was the mystery.

Suggested Cause.—The horse was a young and light-hearted animal, and in play when loose overnight in the yard may have bucked and violently kicked out with his leg and struck a wall or post with such terrific force that the pedal bone was fractured.

Prognosis.—Most unfavourable after all the usual remedies had been employed, and no improvement resulting. Treatment was maintained for some weeks, and owner would not consent to any further removal of the sole and decided to let the horse take his chance. Occasional visits were made, the horse still in pain, and no improvement, and the foot showed symptoms of descent of the pedal bone, as through the exploration hole in the sole the pedal bone could be seen to move when the foot was turned and swayed from side to side. The owner would not consent to a further removal of the sole even at this stage, as he was still hopeful of recovery, thinking, as the horse was young, healthy and strong, that " Nature " would do the rest. Three months elapsed from the onset of lameness to the time when owner consented to a full exploration of the foot. This was done, and on the removal of the sole nearly the whole of the os pedis fell on the ground, a huge cavity was left, and the sensitive sole could be seen receded well up the inside of the wall as the result of no pressure having been exerted on the foot. The horse was slaughtered, the foot boiled, and the bones preserved.

Remarks.—Interest surrounds this case, firstly in the fact that there was no history of injury, strain or any known reason how the bone could have been fractured. Secondly, on account of the attitude of the owner being unwilling to consent to prompt exploration of the foot at the onset. Thirdly, in the resultant specimens showing the altered position of the attacked portion of the os pedis, the angle of the digital bones when in situ, and the exudate and attempt at reorganisation.

PERICARDITIS CAUSED BY A BROOM BRISTLE.

By W. WALLIS, M.R.C.V.S.
(*Barnet*).

THE patient was a cow with tympanitis, stated by a client to have been taken suddenly ill. When I arrived I found definite and distinct heart symptoms, characteristic of the presence of a foreign body in the pericardium. There was tympanitis, but auscultation revealed the tinkling sounds which made me suspect heart mischief, and as the beast was in good condition I advised slaughter for food purposes.

Post-mortem examination revealed the presence of an ordinary stiff bass broom bristle, $3\frac{1}{2}$ inches long, which had threaded its way through the pericardium and embedded itself in the cardiac muscle. Its passage could be distinctly traced from the reticulum, through the diaphragm, and so into the pericardium (which was enormously thickened) to the heart itself. What astonished me at the time was that a bristle should have had such penetrating power.

OBSERVATIONS ON AN OUTBREAK OF RABIES IN THE OLD BERKSHIRE KENNELS IN 1885.

By R. J. VERNEY, M.R.C.V.S.
(*Oxford*).

DURING the second week of April a hound named "Shamrock" was noticed to be unwell and developed rabies in the dumb form, dying about the 18th, after being under observation for four days. About May 16 "Vampire" was noticed to be ill, and had rabies in its worst form, gnawing the woodwork and bricks and tearing the zinc plating off kennel door. This animal was killed as soon as the Master could be communicated with. The huntsman was of opinion that the disease was contracted in the Faringdon country during the last month of the season, there having been some cases of madness in dogs reported from that neighbourhood, but I hear that the hound "Vampire" which was walked in that district was in the habit of going back home and when missed was sent for next morning, and he may have been the source of the infection to the pack, although "Shamrock" was the first hound noticed to be affected. He may have been bitten by a dog when out hunting, and probably "Vampire" was also bitten during one of his excursions home. About a week or ten days after "Vampire's" death three cases occurred in one week, all assuming the dumb form. No other case occurred for a fortnight, but during the third week another, "Bessborough," became affected with dumb madness. This would be about June 12. In the second week of July, one month after "Bessborough's" death, "Affluent" became a victim, also showing the dumb form, and was killed on July 11.

July 12.—Three and a half couple were in hospital for isolation, having been bitten in a kennel row the day before " Affluent " showed symptoms of the disease. Their wounds had been duly cauterised. I noticed they all looked well.

July 16.—Two cases occurred amongst the pack, not in the three and a half couples under isolation.

Case 1, " *Document.*"—The hound I had noticed on Sunday was first noticed unwell at feeding trough on Monday morning and at once isolated. Acute symptoms, no paralysis ; was lying on the bedstead ; came at once to the gate on being called by the huntsman, and was quite inclined to fondle with him through the bars, and, although he had a far-off expression about his eyes, seemed to listen to familiar sounds and looked quite pleased to see the whipper-in come in at the yard gate. He took hold of a crop when presented to him, and kept on biting the bars of the gate, but had no paroxysmal rage. I noticed the brownish coffee colour of his tongue, which was well marked. Saliva flowed copiously when he took hold of the bars. No protrusion of membrana nictitans, and no extraordinary symptoms, except the far-off look in his eyes, and his continual listening attitude. On getting off the bedstead he passed urine without putting up his leg, and very carefully licked it all up, showing a depraved appetite, and I thought from his manner evidence of sexual desire, a condition the huntsman had noticed in most cases at their commencement.

As the huntsman had the impression (very prevalent) that there was a dread of water, I demonstrated the fallacy of that idea to him. *A bucketful of water was placed against the bars outside the gate of which he took no sort of notice, but on the other hand did not draw back from it. It was then put inside the gate, and for a few seconds the dog did not take any notice of it, but after that he drank freely and without any noticeable trouble, neither did it excite any further rage.* He still kept on biting the bars, and stood looking intently at us, evidently recognising the huntsman and the whipper-in.

Case 2, " *Blueman.*"—Well-marked case of dumb rabies and pitiable to look at indeed. He was tied up by a collar and chain, and stood all in a heap when the door was opened, moved as soon as we entered, and recognised the huntsman. When spoken to he came the length of chain towards him and tried to pick up a piece of biscuit, but this he was unable to accomplish. His lower jaw was hanging down quite loose, and his mouth and tongue were quite dry. The membrana nictitans was half over the eye and very red. All the muscles of his shoulders and back were rigidly contracted, and this extended to the tail, which was raised at the root in a ring-like curve, cocked, as we would term it in a horse with tetanus, but was firmly curled between

his legs. His breathing was difficult, and he also slightly moaned. When he tried to cry his voice seemed lost in hoarseness. He was very restless, but it was of an idiotic character, purposeless, giving me the idea that he would have gone out had he been loosed and then wandered aimlessly about.

" Blueman " was subject to kennel lameness, affecting his back, and when first amiss was thought to be affected by this, and stimulating embrocation applied. Other symptoms, however, followed, which clearly demonstrated the nature of disease.

The body of the pack, with which the three and a half couple before isolated had now been replaced, were let out for exercise in the grass yard, and the huntsman at once picked out " Victor," who was at once drawn and isolated. He had fed well and looked full, and presented no other than ordinary symptoms of health except, perhaps, looking a trifle dull. The huntsman informed me he had noticed him go round and round a tree and then come back and smell the same place again and again, displaying to him more or less mental aberration not noticeable to a stranger.

July 17.—" Blueman " still alive, but much more paralysed and unable to stand. " Document " still alive and his symptoms much the same. Tendency to bite just as strong, snapping at a hunting crop when presented to him and biting the bars. No symptom of paralysis about legs or body, but when standing in the before-noticed listening attitude his lower jaw dropped a little. *He still drank quite freely and without any difficulty from the bucket which had been placed in his kennel yesterday, and which was now partly empty.* After our entrance he got off the bedstead and stood intently watching us, recognising the huntsman without a doubt, especially when spoken to.

" Victor," the hound isolated yesterday morning, had developed further symptoms, which commenced by general dullness and slight stiffness in his left shoulder. He was lying on the bedstead, and when called sat up with some difficulty, hesitating to come down. Seemed quite sensible, and after getting down from the bedstead even wagged his tail and put himself up against the bars to be caressed. The membrana nictitans was protruded, and paralysis of limbs and back most marked. He reeled about in his walk, and very unsteadily got back to his bedstead, to get on which he had much difficulty. He then sat down and held his left fore limb up from the floor, as if in pain. He took food readily in the morning, and seemed to have no disposition to bite whatever. Both these hounds died.

A lot of hounds were lost, and the next season the pack was made up with gifts of couples from here and there.

RADICAL CURE PERFORMED FOR SCROTAL HERNIA IN A TUP HOG.

By DAVID IMRIE, M.R.C.V.S.
(*Professor of Surgery, The Veterinary College, Glasgow*).

THE patient, a highly-bred black-faced tup hog of great value, had a right-sided congenital scrotal hernia. When first consulted about it the hernia was of considerable size, but in the interval before operation—a matter of a few weeks—it had increased in dimensions greatly, assuming enormous proportions, and reaching, when the animal was standing, almost to the ground. It was reducible, and the external ring on that side was very large, as felt by digital examination.

Operation.—The abdominal wall, scrotum and thigh were shaved and thoroughly cleansed the day before operation with soap and water, turpentine and spirit. The tup received three drams of chloral hydrate in solution with water by the mouth, and after the lapse of twenty minutes was placed on the table and secured in the dorsal position. The large hernia was now reduced, but before this could be accomplished it was found necessary to raise the hind parts by elevating this end of the table. The part prepared was painted with tincture of iodine, and an incision two inches long was made over the external abdominal ring and nearly parallel with Poupart's ligament. The incision was deepened until the sac was reached. This was picked up

incised, and some omentum and bowel returned to abdominal cavity. The sac was, by blunt dissection, separated from the surrounding tissues. The cord elements were looked for, found, and separated, also by blunt dissection, down to the testicle. The sac was of the congenital type—a patent *processus vaginalis*. It was cut through in the middle of its length and the lower half, after being detached from the testicle—the latter being inside—was removed.

Treatment of Remaining Half of Sac.—The lower opening of sac was closed by purse string suture of stout catgut. The same suture was used and was passed through the sac a few times until the internal abdominal ring was reached. This was done by first passing the needle through from front to back and then from back to front of the sac. The curved needle was now replaced by a hernia needle, which was passed along the short, wide inguinal canal—it was very wide and only about half an inch long—and into the abdominal cavity, and then out through the abdominal wall about one inch internal to internal abdominal ring. The hernia needle was removed and the suture pulled tight. The result was, the sac was puckered up and placed in contact with the abdominal wall internally. This position was secured by using a curved needle and anchoring the sac by a few stitches to the abdominal wall.

There was still the weakness of the part to treat, as the wide canal was only half an inch long, and went practically straight back from the large external abdominal ring to the abdominal cavity. Two mattress sutures were employed. The hernia needle, threaded again with stout catgut, was passed into the abdominal cavity and out first on one side and then on the other side of the canal. This was repeated a little lower down ; that is, nearer the scrotum. The sutures were pulled tight and tied. The result was that the space which was an open invitation to the bowel to come down again was closed, there being left only sufficient room for the cord to pass down comfortably without its being subjected to pressure.

The skin and subcutaneous tissues were closed by interrupted silkworm gut sutures and a pad of sterile gauze applied to the part and kept in position by adhesive plaster and a bandage.

After two weeks the wound was examined, found to be clean, and treated as before. On the sixteenth day the skin sutures were removed and the wound found to be completely healed.

A considerable swelling occurred in the scrotum a day or two after operation. It was boggy in nature, not painful, and, gradually subsiding, had almost completely disappeared in three weeks.

The small skin wound was only to be seen if searched for, and now, six weeks after the operation, the scrotum appears quite normal. It

may be stated that the anæsthesia was perfect. The patient never moved during the operation, which occupied fully an hour, and did not at any time appear to suffer any ill-effects from the operation.

ORCHITIS IN THE DOG.

By G. MAYALL, M.R.C.V.S.
(*Bolton*).

An Airedale-terrier dog, "Jack," the property of a cotton mill watchman, was brought to me on April 27 with his testicles and posterior portion of the penis greatly swollen. He had jumped some high iron palings surrounding the mill and caught his testicles on the moderately blunt pointed ends of the railings when going over. The swollen organs measured in circumference, taken over the scrotal skin, 7¼ inches by 6¼ inches. There was no breach in the skin, but the parts were hot and painful, and especially tender at the front of the swelling, and the posterior portion of the penis and erectile enlargements were swollen. The testicles and scrotum were gently massaged with collosol iodine oil (Crookes'), 3 per cent., and a teaspoonful of colloidal iodine, 1 in 500 (Crookes'), was given three times daily by the mouth. On April 28 the swelling burst at the front and discharged a mixture of blood and serum. On the 30th the parts had declined in size and the scrotal wound was looking quite healthy and dry. It was dressed with dermatol, and the internal administration of the colloidal iodine continued three times daily. On this day the dog unloosed the snap of his chain and jumped a 4-ft. 6-in. half door into the yard. The testicles were almost normal in size on May 3, and on May 5 he was discharged, with some dry dressing to apply to the scrotal wound. I have treated one or two cases of orchitis in the dog, but never had one where the organs were so greatly swollen as in this one, or where the case progressed more rapidly to a favourable issue. Gentle exercise also aided in reducing the swollen organs.

ARSENICAL POISONING IN CHICKENS.

By MAJOR C. G. SAUNDERS, D.S.O., B.V.Sc., M.R.C.V.S.
(*Worthing*).

Owing to several deaths in a flock of chickens a dead bird was brought for post-mortem examination, but with very little history as to symptoms preceding death. The post-mortem revealed a slightly congested condition of the mucous membrane of the whole of the alimentary tract, but nothing typical. As I had had several cases of arsenical poisoning in cats and dogs, I tested the crop and intestinal contents for arsenic by Reinsch's test, obtaining a very typical reaction, and it was confirmed in the usual way.

Upon visiting the poultry pens it was found that all the deaths had occurred in a pen situated close to a hedge, upon the other side of which the neighbours had been burning an accumulation of weeds, which had been killed by the application of arsenical weed-killer. The smoke from the bonfire drifted over the hedge and over this particular pen. The owner was advised to remove all the fowls from that pen to another part of the premises. This was done, and no further deaths have occurred. In all, three post-mortems were made, none of which showed the typical lesions of arsenic poisoning, but I was able to demonstrate the presence of arsenic in each one of them.

ROSE CHAFER POISONING IN CHICKENS.

By B. A. GALLAGHER,
Washington, D.C.

Extensive losses among chickens, generally attributed to other causes, result from eating rose chafers which invade certain sections of the country during the latter part of May, June and early July. Several cases of rose chafer poisoning have recently been observed in young chickens submitted to the Pathological Laboratory of the Bureau of Animal Industry for examination. In these cases the losses reported ranged from 25 chickens in one flock to 85 in another. Reports of similar outbreaks, however, indicate that the mortality from this cause may run much higher, depending upon the number of birds exposed.

Appearance, Distribution, Habits.

The rose chafer or "rose bug" (*Macrodactylus subspinosus*) is a light ochre or yellowish brown-coloured beetle about one-third of an inch in length, and has long, spine-covered legs. It is found in the area extending from Canada to Virginia, Tennessee and Oklahoma, and from the Atlantic Coast to Colorado. These beetles usually appear suddenly late in May or early in June in the southern part of their range and about two weeks later in northern regions. Their coming corresponds rather closely to the time of blossoming of various garden flowers. They disappear about a month or six weeks after their arrival. Some years rose chafers are much more abundant than in other years, and work great havoc on vegetation, especially on vineyards.

Nearly every form of vegetation is attacked, blossoms, leaves and fruit being consumed. The chafers feed on roses and other garden flowers, ornamental plants, shade trees, shrubbery, grapes and other garden fruits, many garden vegetables, corn, wheat and grasses, also on various weeds and wild plants.

Life History.

One generation of rose chafers is produced annually. The length of life of an individual is about three weeks, and during this time the male and female are almost constantly paired. The female deposits an average of 30 eggs from one-fourth of an inch to four inches below the surface of the ground, usually in sandy soil. The eggs are deposited singly in the walls of small burrows. Larvæ hatch in from two to three weeks, appearing as yellowish white grubs with brownish heads. These feed upon the roots of plants until late in autumn, when they burrow deeper in the ground below the frost line. In the following spring they return to near the surface and transform to pupæ. After two to four weeks the pupæ transform to beetles, which pass out of the soil, mate, and begin feeding on the surrounding vegetation.

Susceptibility of Chickens.

Reports of outbreaks, and experiments carried out by Lamson, indicate that chickens over 10 weeks old are not killed by feeding on the insects, although symptoms of poisoning are sometimes produced. Lamson states that from 15 to 20 rose chafers are sufficient to cause the death of a chicken one week old; from 25 to 45 are necessary to kill a three weeks old chicken, and that 96 killed a 10 weeks old chicken. Apparently the poisonous effect of the insect varies, as autopsies conducted by the writer on chickens ranging from two to eight weeks old disclosed not over 10 rose chafers in the crop of any chick, and as few as two insects were found in the crop of an eight weeks old chick which died from this cause. When rose chafers are numerous, however, chickens will devour large numbers and the crop may be distended and present the appearance of "crop bound."

That deaths are due to the poisonous nature of the insects rather than to mechanical interference is proved by Lamson, who found that a filtered watery extract of crushed rose chafers fed to chickens produced death in the same manner as the insects. When injected into the veins of rabbits in 2.5 c.c. to 4 c.c. doses the extract caused death in from 55 seconds to six minutes. Lamson believes that the poisonous principle is a neuro-toxin which has an effect upon the heart action.

Symptoms.

Symptoms may appear as early as one hour after feeding on the beetles. The affected bird becomes drowsy, shows weakness of the legs, and falls over on its side. There may be convulsive movements. Sharp cries are frequently emitted, and retraction of the head and neck over the back of the chicken is quite characteristic. Death occurs in the period up to 24 hours after eating rose chafers. In the outbreaks observed by the writer death followed in from half to one

hour after symptoms were observed. If a sufficient amount of the poisonous principle to produce death is not absorbed the symptoms disappear.

Post-Mortem Appearance.

On autopsy the affected birds fail to show changes in appearance of the alimentary tract or other internal organs, other than an injection of the blood vessels of the heart wall in a minority of the cases. The only diagnostic clue presented is the presence of rose chafers in the crop. These appear darker in colour than when observed in the free state, owing to the action of the crop contents on the yellow pigment of their bodies.

Treatment.

The rapid action of the toxin renders treatment unsatisfactory in birds showing symptoms. An effort, however, may be made to reduce the mortality by administering a purgative to all exposed chickens of the flock as soon as the nature of the trouble is realised. Teaspoonful doses of castor oil containing 15 drops of turpentine would be indicated and may also be given to birds showing symptoms. In a large flock, however, individual treatment would be too slow and tedious, hence the use of Epsom salt would be advisable. This should be given in the proportion of one-fourth of a teaspoonful to each bird under 10 weeks old. The total amount of salt necessary is dissolved in water and mixed in the amount of mash which the flock will readily consume.

Prevention.

During the period when rose chafers are present young chickens may be kept in enclosed runs or at points where they will not have access to grape vines, rose bushes, shrubbery, vegetables and other flowering plants infested by the insects.

Arsenate of lead and Bordeaux mixture thoroughly sprayed on vines, bushes, etc., before the blossoms appear, and once or twice while the beetles are present, will do much to destroy the pest and prevent serious injury to plants and chickens.

The rose chafer while in the pupal stage may be readily destroyed by ploughing and harrowing infested soil during May in the southern range of the insects, and during the latter part of May and early June in their northern range.

References to Literature.

Chittenden, F. H., and Quaintance, A. L. The rose chafer: A destructive garden and vineyard pest. U.S. Dept. Agr., Farmers' Bul. 721 (1916).

Johnson, Fred. Vineyard spraying experiments against the rose chafer in the Lake Erie Valley. U.S. Dept. Agr., Bur. Ent. Bul. 97, part 3 (1911).

Lamson, George H., Jr. The poisonous effects of the rose chafer upon chickens. Science, n.s., vol. 43 (1916), p. 138.

Ward, Archibald Robinson, and Gallagher, B. A. Diseases of domesticated birds, 1920.—*Journal American Veterinary Medical Association.*

RECOGNITION OF THE WORK DONE BY THE ROYAL ARMY VETERINARY CORPS DURING THE GREAT WAR.

Decorations and Awards.

	Number Awarded.
K.C.B.	1
K.C.M.G.	3
C.B.	8
C.M.G.	21
C.B.E.	16
D.S.O.	53
O.B.E.	94
M.C.	49
M.B.E.	16
C.I.E.	2
To be Major-General	2
To be Brevet Colonel	2
To be Brevet Lieutenant-Colonel	20
To be Brevet Major	21
To be Brevet Colonel on promotion to Lieutenant-Colonel	1
To be Major	1
To be Honorary Captain	1
Next higher rate of pay	2
Order of the Nile, "Third Class"	2
Order of the Nile, "Fourth Class"	7
Croix de Guerre	11
Ordre du Merite Agricole, "Officier"	6
Ordre du Merite Agricole, "Chevalier"	18
Medaille d'Honneur avec Glaives, "En Vermeil"	2
Ordre de Leopold avec Croix de Guerre, "Officier"	1
Ordre de Leopold avec Croix de Guerre, "Chevalier"	1
Legion d'Honneur Croix d'Officier	1
La Medaille de la Reconnaissance Française, "Second Class"	1
La Medaille de la Reconnaissance Française, "Third Class"	2
Order of the Crown of Italy, "Officer"	1
Croce di Guerra (Italy)	1
Order of St. Maurice and St. Lazarus, "Cavalier" (Italy)	2
Order of the Redeemer, "Third Class" Commander	1
Military Order of Aviz, "Commander"	1
Military Order of Aviz, "Chevalier"	2
Order of El Nahda, "Fourth Class" (King of Hedjaz)	1
Greek Medal for Military Merit, "Second Class"	1
Order of the White Eagle, "Third Class," with Swords (Serbian)	1
Order of St. Anne, "Third Class," with Swords	1
Order of St. Stanislav, "Second Class," with Swords	3
Order of St. Stanislav, "Third Class," with Swords	1
Total	381

1,681 Officers served in the R.A.V.C. during the war, and the names of 551 appear in the despatches published in the London Gazettes. The total number of mentions in these despatches reached 857.

In addition some 40,000 warrant officers, non-commissioned officers and men served in the Corps. These received no fewer than 443 decorations and 518 were mentioned in despatches.

Sixty-two were killed in action and 449 died on active service.

Review.

THE EARLY STAGES OF THE TABANIDÆ (HORSE-FLIES). By WERNER MARCHAND, Ph.D. Monographs of the Rockfeller Institute for Medical Research No. 13, November 15, 1920.

THE object of this work of over 200 pages, with 15 plates, containing 186 figures, as explained by the author in the introduction, is primarily to collect all the known facts concerning the immature stages of this important group, which in this country are variously referred to as brimps, breeze flies, gad-flies and dun flies. Such a collection of facts on a definite subject concentrated in one publication cannot but be of the greatest value to workers in the field without facilities of consulting libraries. Even where this is possible the monograph forms a directory.

Although the Tabanidæ play a considerable part in the transmission of diseases of the domesticated animals, and in spite of the trouble which their presence in great numbers causes to horses and cattle under even normal conditions, our knowledge of their life histories is very incomplete compared with that which we possess of the other groups of blood sucking insects—for instance, the Culicidæ.

A chapter is devoted to the history of tabanid investigations, starting with those of de Geer in Sweden in 1760, down to the more numerous workers of the last twelve or fourteen years.

This is followed by a general description of the early stages of the family. Neaves' work on the bionomics of the tabanids in Nyasaland has shown that the majority brood only once a year. This is true of *Tabanus*, but certain species of *Chrysops* and *Hæmatopota* may be double brooded, this depending on the larval food supply and climate. Apparently in many cases the larva grows very slowly after hatching and takes six months to become full grown. It then, especially in *Tabanus*, goes through a resting period, being buried in sand or mud ; then follows a short pupal period of 10 to 18 days. It would appear that larvæ which miss pupation may remain in the larval stage until the following year. Following this general account, the known early stages of the various species of *Chrysops*, *Tabanus*, *Hæmatopota* and other less important genera, are considered in detail. The family consists of more than 2,000 species and of these data of the early stages is known only in 91, and in a number of these it is very incomplete. A table is given showing the names of these 91 species, and their habitats together with columns for particulars concerning the eggs, larvæ and the habits of the larvæ. In the former two columns the names of authorities and the dates of their work are stated. Extracts from this table concerning some of our British species, show that there is no information available with regard to the egg of

Chrysops relictus. The same is true of *Hæmatopota pluvialis, Tabanus bovis, T. bromius* and *T. cordiger*, all the larvæ of which are terrestrial.

As one of the few completely known life cycles Neaves' work with *Tabanus corax* Lœw in Southern Nyasaland may be quoted. The eggs are deposited on reeds of grass overhanging mud in the bush. The egg mass is at first white, but hardens to a grey colour; the individual eggs are spindle shaped; hatching takes place in about five days, the shell splitting down the long axis. The larva drops into the mud or water below, and may bore to some depth to afterwards undergo pupation; the larvæ are ferociously cannibalistic.

An account of the parasites of the eggs and immature forms includes 3 *Phanurus* sp., 2 *Telenomus* sp., 3 *Chalcids* and 1 *Tchneumonid*.

A few useful notes on the methods of rearing and studying tabanids in their immature stages is given. The work concludes with an extensive bibliography. A. W. N. P.

RESEARCH SCHOLARSHIPS IN AGRICULTURAL AND VETERINARY SCIENCE.

The Ministry of Agriculture and Fisheries invites applications for Research Scholarships in Agricultural and Veterinary Science.

Applicants for these Scholarships must be nominated by a Professor or Lecturer of a University or College. Nominations must be received not later than July 15 next, and must be made on the prescribed form to be obtained from the Secretary, Ministry of Agriculture and Fisheries, 4, Whitehall Place, S.W.1.

The Scholarships are tenable for two years, and are of the value of £200 per annum. The number to be awarded in the present year will depend upon the qualifications of applicants, and will in any case not exceed five.

The Agricultural Scholarships are open to graduates with honours in Science of a British University who give evidence of high proficiency in subjects having a direct bearing on agriculture. The Veterinary Scholarships are open to students who have secured the diploma of the Royal College of Veterinary Surgeons.

(*Ministry of Agriculture and Fisheries.*)

Correction.

DEVELOPMENT COMMISSION.

In the list of members of the Advisory Committee on Research into Diseases of Animals, the name Sir John W. Frodyear, M.B., B.Sc., M.R.C.V.S., LL.D., should have read Sir John McFadyean, M.B., B.Sc., M.R.C.V.S., LL.D.

NOTICES.

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